

**REMARKS****Claim Rejections*****Status of Claims***

Upon entry of the foregoing amendments, claims 1, 4-21 and 23-25 (22 total claims, 2 independent claims) remain pending in this application. Applicants respectfully request reconsideration and allowance of the pending claims in view of the following remarks.

***Rejections Under 35 U.S.C. § 112***

The Office Action asserts that claims 1-25 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Particularly, the Office Action contends that Applicants' description of the cell as an "electrochemical" cell is incorrect and that the claims should more accurately read "electrolytic" cell. The Office Action states that an electrochemical cell uses chemical changes in the reactants to produce energy, whereas an electrolytic cell uses energy to produce chemical changes in the reactants. Since the electrowinning reaction consumes energy to produce chemical changes, the Office Action states that Applicants should claim an electrolytic cell.

While Applicants disagree, in the spirit of compact prosecution, Applicants have amended the claims to reflect the use of "electrolytic" as opposed to "electrochemical".

***Rejections Under 35 U.S.C. § 102(b)***

In the Office Action, claims 1-5, 8-14, 18, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Young et al., U.S. Patent No. 5,622,615, (hereinafter, "Young"). Applicants respectfully traverse the § 102(b) rejections for claims 1-5, 8-14, 18 and 22.

Applicants note that amended claim 1 recites a method for electrowinning copper comprising, among other steps, "providing an electrolytic cell comprising at least one flow-through anode and at least one cathode, wherein said cathode has an active surface area...." While the

Office Action states that a flow-through anode (Example 7) of Young is disclosed such that the flow-through anode of independent claim 1 is anticipated, Applicants respectfully disagree.

Young, in Example 7, discloses, at most, the spacing between electrodes, but does not permit flow through the anode. Nowhere in Young is any aspect of a flow-through anode taught. Young discloses (Example 7 and column 9, lines 32-35) a 1/4" thick Eltech ALE anode which is clearly not a flow-through electrode. Accordingly, since each and every element of claim 1 is not taught, Applicants respectfully request the withdrawal of the § 102(b) rejection.

Similarly, as it relates to claim 18, claim 18 similarly recites a process for electrowinning copper comprising, among other elements, "at least one flow-through anode and effectively circulating said electrolyte within said electrolytic cell ...." As such, claim 18 is also not anticipated.

Furthermore, claim 18, as amended, recites a current density range of "about 26 to about 35 amperes per square foot." Support for the amendment can be found in paragraph [0051] of the subject specification. Young does not teach or suggest such a current density range.

Dependant claim 5 of the present invention claims a method according to amended claim 1, wherein operating said electrolytic cell at a cell voltage comprises operating said electrolytic cell voltage of less than about 1.0 volts. The Office Action states that claim 5 is anticipated by Young because Young teaches a voltage as low as 1.03 Volts, which is less than about 1.0 Volts. Applicants respectfully disagree.

The lowest Voltage taught by Young is 1.03, and the other voltages taught by Young are much higher; thus, Young does not teach a voltage of less than about 1.0 Volts. Accordingly, since each and every element of claim 5 is not taught, Applicants respectfully request the withdrawal of the § 102(b) rejection of claim 5.

Dependant claim 9 claims the method according to claim 8 (which variously claims dependency upon amended claim 1) wherein the anode comprises, "...titanium mesh having an electrochemically active coating." The Office Action states that claim 9 is anticipated by Young because Young teaches using an electrocatalyst coated titanium as the anode. Applicants respectfully disagree. Young discloses "Eltech's Activated Lead Electrode (ALE) anode or precious metal oxide (like RhO<sub>2</sub>/IrO<sub>2</sub>) coated titanium anode also known as a Dimensionally Stable

Anode (DSA)." Nowhere is the titanium mesh flow-through anode disclosed or taught by Young. Accordingly, since each and every element of claim 9 is not taught, Applicants respectfully request the withdrawal of the § 102(b) rejection of claim 9.

Claims 4, 8, 10-14 variously depend from claim 1 or 18 and, as such, are not anticipated for the above reasons. In sum, Young does not teach each and every element of either independent claims 1 or 18, or claims 2-5, 8-14, and 22 which variously depend therefrom. Applicants therefore respectfully request the withdrawal of all § 102(b) rejections for claims 1-5, 8-14, 18, and 22.

#### *Rejections Under 35 U.S.C. § 103(a)*

In the Office Action, claims 6, 7, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young. In particular, the Office Action contends that with regard to claims 6, 7, and 19, Young teaches varying the flow rate of the electrolyte and describes it as a result effective variable. The Office Action further contends that it would have been obvious to one of ordinary skill in the art to have optimized the flow rate of the electrolyte in the electrolytic cell. Applicants respectfully traverse the § 103(a) rejections to claims 6, 7, and 19-21.

To establish a *prima facie* case of obviousness, the reference must contain some suggestion or motivation, either in the reference itself or in the general knowledge available to one of ordinary skill in the art to modify or combine teachings, there must be a reasonable expectation of success, and the reference must teach or suggest all of the claim limitations.

While Young in Example 6 illustrates variable flow rates, Young does not teach the flow rates of Applicants' claims 6, 7, and 19. Young teaches at its lowest flow rate, a rate of 2 GPM. This is double the highest flow rate claimed by Applicants. Young does not recognize, nor is it obvious, to modify the structure of Young with a flow-through anode so that the lower flow rate claimed by Applicants may be used. Instead, the Office Action relies upon impermissible hindsight to modify the teaching of Young to disclose that which Applicants claim as their invention. Accordingly, since each and every element of claims 6, 7, and 19 are not taught, Applicants respectfully request the withdrawal of all § 103(a) rejections of claims 6, 7, and 19.

With regard to claim 20, the Office Action asserts it would have been obvious to have facilitated the electrolyte circulation by using a flow manifold because a flow manifold would have

allowed easy distribution of the electrolyte to multiple cells simultaneously, thereby increasing productivity. Applicants respectfully disagree.

Young does not teach or suggest that one can, "...facilitate effective electrolyte circulation by providing a flow of electrolyte through [an] electrolytic cell using an electrolyte flow manifold" as required by Applicants in claim 20. While Young teaches several alternatives including taller or longer embodiments, Young does not teach alternative elements, such as Applicants' electrolyte flow manifold. Accordingly, since each and every element of claim 20 is not taught, and since there is no motivation or suggestion to modify the reference, Applicants respectfully request the withdrawal of the § 103(a) rejection of claim 20.

With regard to claim 21, the Office Action contends it would have been obvious to have provided the flow of electrolyte into and through the flow-through anode in order to allow the electrolyte to react with the anode to oxidize the ferrous ions to ferric ions before the electrolyte reached the cathode.

Again, Young does not contain any suggestion or motivation to modify their teachings to disclose that which Applicants claim as their invention. In particular, Young does not recognize, "...injecting at least a portion of said electrolyte into said at least one flow-through anode" as required by Applicants in claim 21. Accordingly, since each and every element of claim 21 is not taught, and since there is no motivation or suggestion to modify the reference, Applicants respectfully request the withdrawal of the § 103(a) rejection of claim 21.

With regard to all of the rejected claims; 6, 7, and 19-21, recall that they variously depend from amended claims 1 and 18, thus, likewise require the limitation of a flow-through anode as in claims 1 and 18, as discussed above.

In the Office Action, claims 15-17 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young in view of Sandoval et al., U.S. Patent No. 5,492,608 (hereinafter, "Sandoval"). In particular, the Office Action acknowledges that Young does not teach or suggest recycling of electrolyte wherein at least a portion of the ferric ions are reduced back to ferrous ions to form a regenerated electrolyte. However, the Office Action contends that Sandoval teaches recycling a copper electrowinning electrolyte through activated carbon modules and exposing the electrolyte to sulfur dioxide gas to reduce the ferric ions back to ferrous ions to form a regenerated electrolyte which is fed back to the cell. Thus, the Office Action contends, it would have been

obvious to incorporate the recycle line taught by Sandoval in the method of Young to effectively recycle the electrolyte to reduce waste, and that the carbon acts as a catalyst in the process. Applicants respectfully traverse the § 103(a) rejections to claims 15-17 and 23-25.

Applicants note that there is no suggestion either in Young or Sandoval to combine the alleged teachings in the manner posited in the Office Action. As such, Applicants submit that the proposed combination is improper.

Claims 15-17 and 23-25 variously depend from independent claims 1 and 18. As noted above, each of these claims positively recite a flow-through aspect, which aspect is nowhere taught or suggested in Sandoval. Accordingly, since each and every element of claims 15-17 and 23-25 are not taught, and since there is not motivation or suggestion to modify or combine the references, Applicants respectfully request the withdrawal of all § 103(a) rejections of claims 15-17 and 23-25.

### CONCLUSION

In view of the foregoing, Applicants respectfully submit that all of the pending claims are allowable over the prior art of record. Reconsideration of the application and allowance of all pending claims are earnestly solicited. Should the Examiner wish to discuss any of the above in greater detail or deem that amendments should be made to improve the form of the claims, the Examiner is invited to telephone the undersigned at the Examiner's convenience.

Moreover, Applicants authorize and respectfully request that any fees due be charged to Deposit Account No. 19-2814. This statement does NOT authorize charge of the issue fee.

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Respectfully submitted,  
By: \_\_\_\_\_  
Charles F. Hanff, Jr.  
Reg. No. 33,244  
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SNELL & WILMER L.L.P.  
400 East Van Buren  
One Arizona Center  
Phoenix, Arizona 85004-2202  
Telephone: (602) 382-6314  
Facsimile: (602) 382-6070